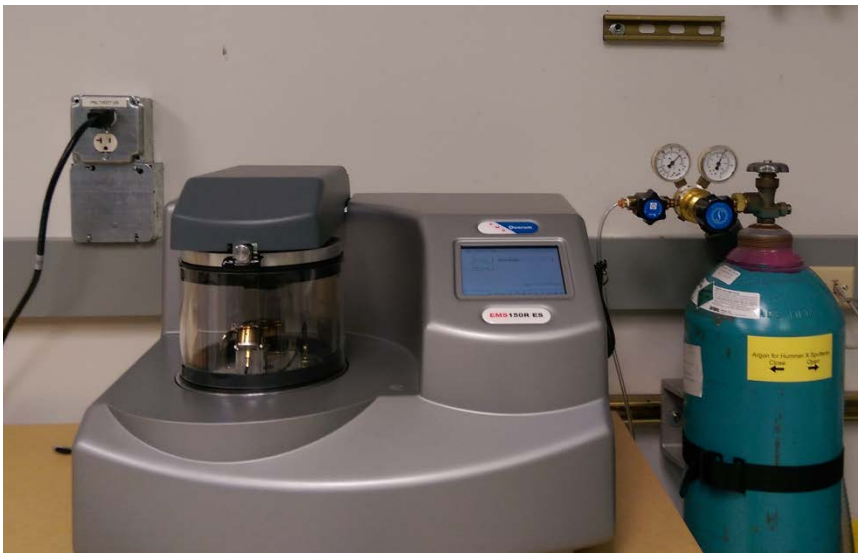
QUORUM TECH 150RES

This document is intended to describe the function and use of the QuorumTech Q150RES system. Formal training and qualification by staff is required before gaining access to the tool.



The Q150RES system is a versatile sputter coater/carbon evaporator for preparing specimens for examination by electron microscopy. This tool is strictly for the use of coating thin films of material in order to minimizing charging effects during imaging.

This system includes:

- Sputter coating with gold and gold palladium
- Carbon coating with quick flash evaporation using a fiber insert (not carbon rods)
- Film thickness monitor which can measure coating thickness applied to the sample as well as terminate a coating cycle once a required thickness has been achieved

NOTE:

THE FIRST AND THIRD WEEK WILL BE SET UP FOR CARBON COATING

THE SECOND AND LAST WEEK WILL BE SET UP FOR GOLD COATING

PLEASE CONTACT STAFF IN ORDER TO SWITCH BETWEEN CARBON EVAPORATION AND GOLD COATING SET UP

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System overview

The Quorum Tech Q150RES uses an Argon gas supply for the thin film coating of gold and carbon. The sputter coating assembly is designated for coating thin gold films (~10 nm) per run. This assembly can be interchanged with a carbon fiber evaporation set up for carbon films up to 20 nm of thickness per run. The thickness of the coating can be monitored with a crystal film thickness monitor, as long as the cap for the crystal is open before running the process. Figure 1 shows the hardware components for the sputter coating, the process is controlled by a touch-screen (Fig 2). Use the stylus to edit profile parameters (i.e thickness), as appropriate.

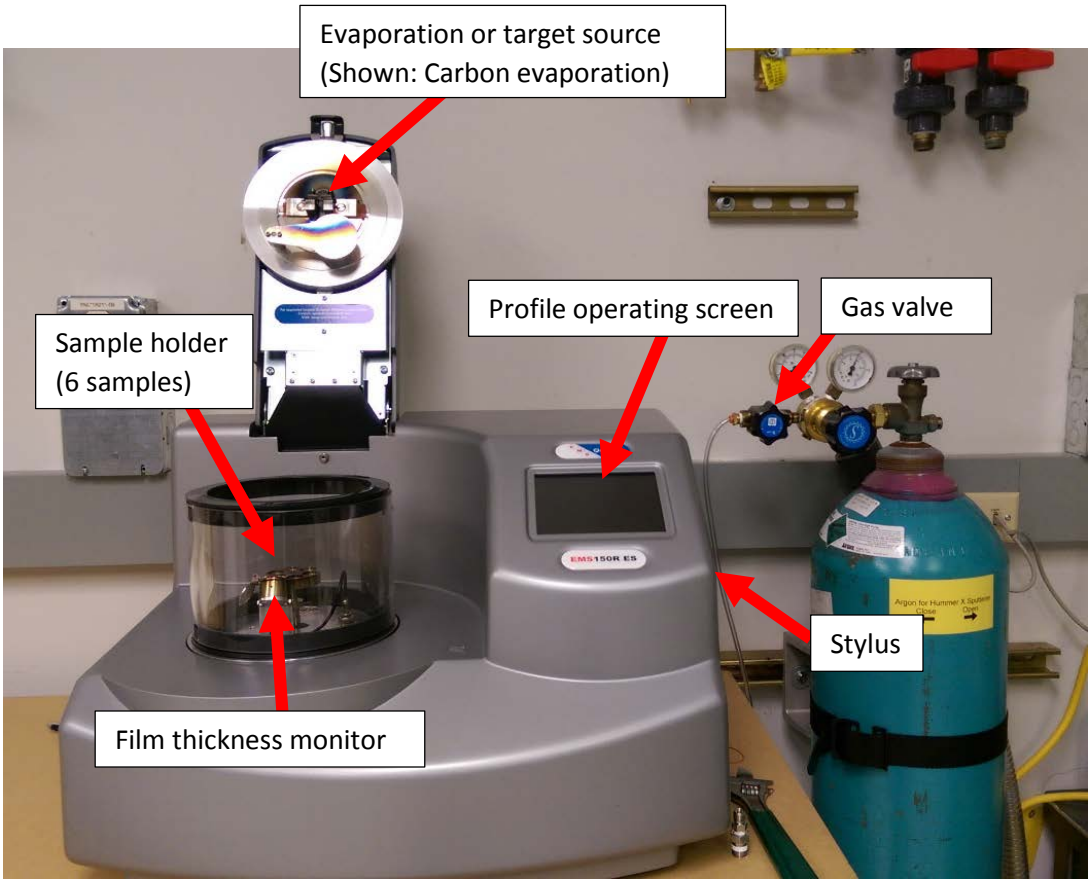


Figure 1. Overview of hardware components

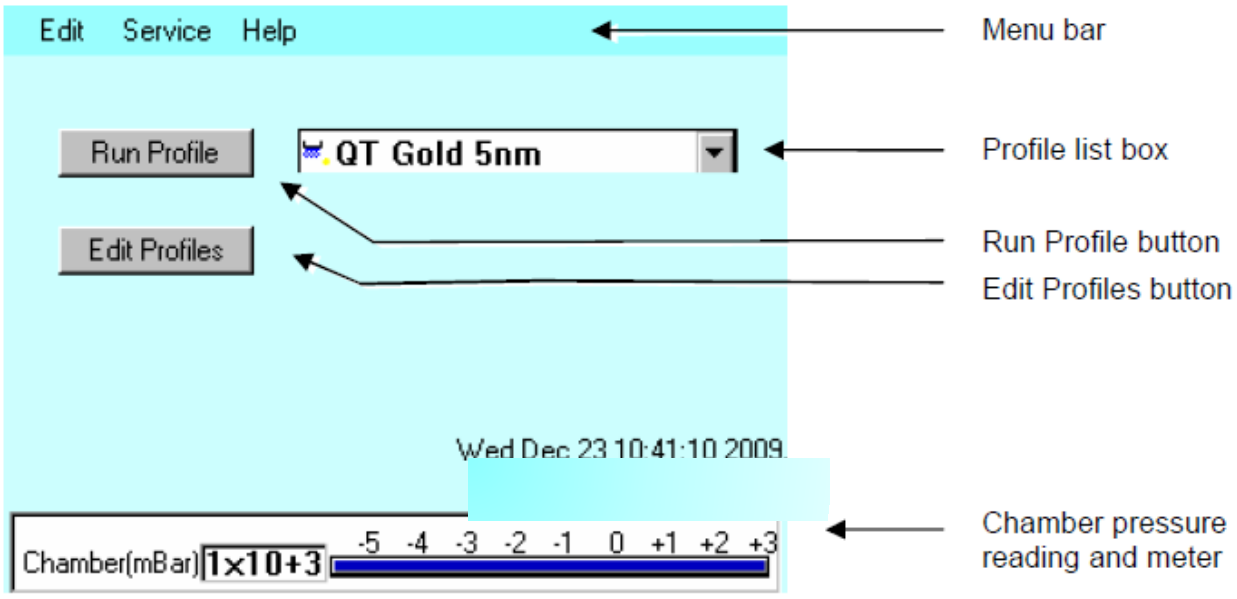


Figure 2. Overview of touch screen controls.

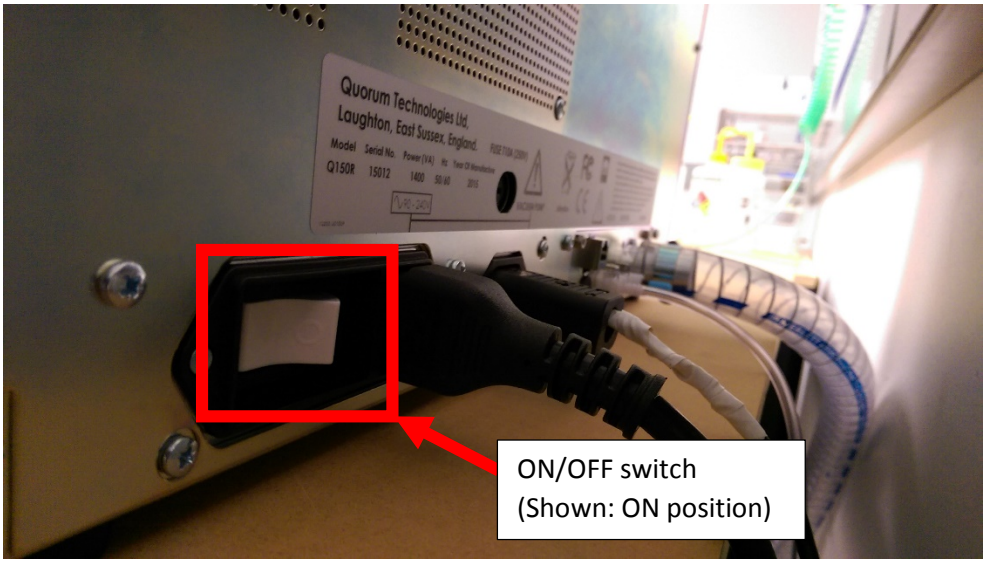
STANDARD OPERATING PROCEDURE

Initial checks

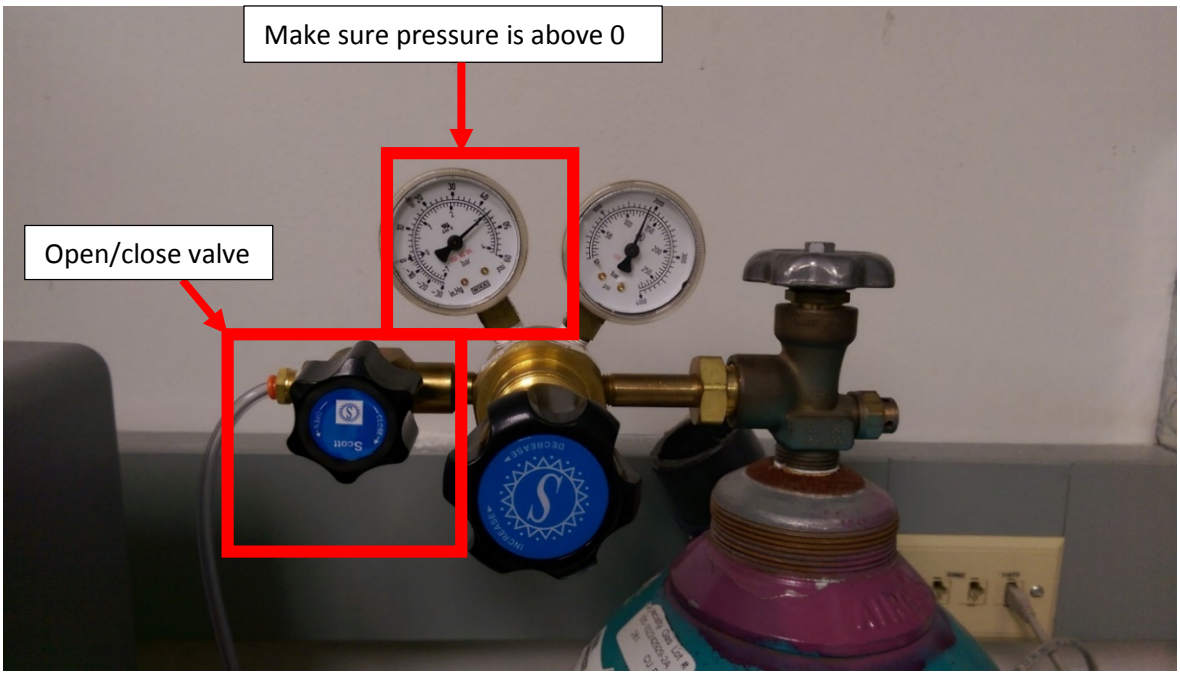
Wear gloves when handling the machine or your samples

Tweezers are available for handling your samples

Make sure the system is enabled on Badger. Turn on machine (if necessary)

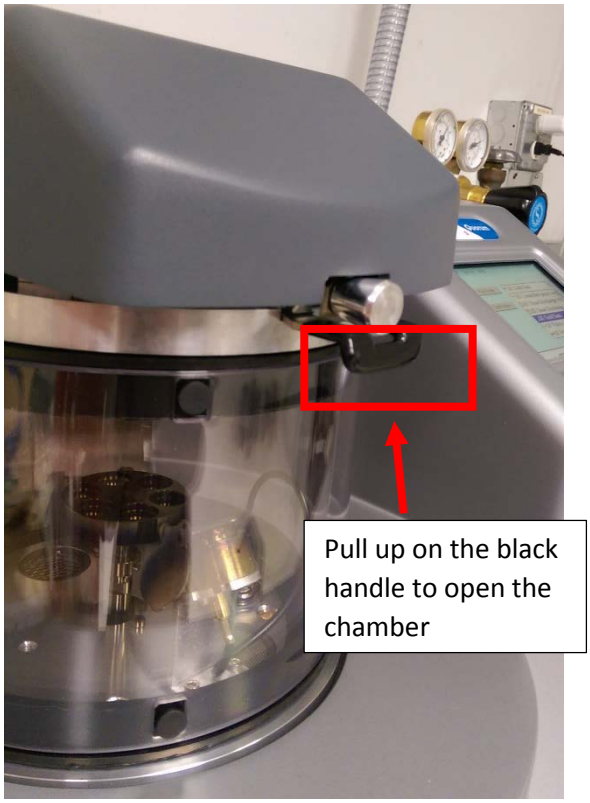


Make sure gas valve is open and flowing by reading a pressure on the gauge that is greater than 0 psi

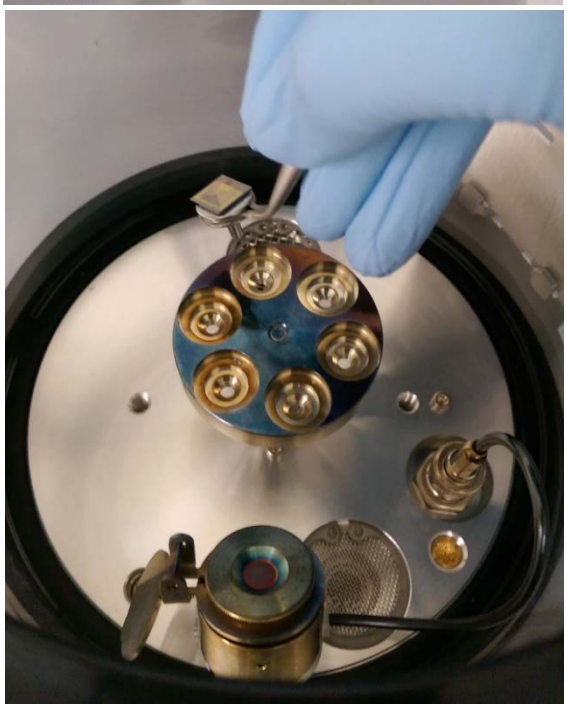


Loading

Open the chamber, and make sure evaporation source or sputtering target has been loaded. Move the shutter over the evaporation or the sputtering target if necessary. Moving the shutter will minimize the amount of excess material being deposited onto your sample.



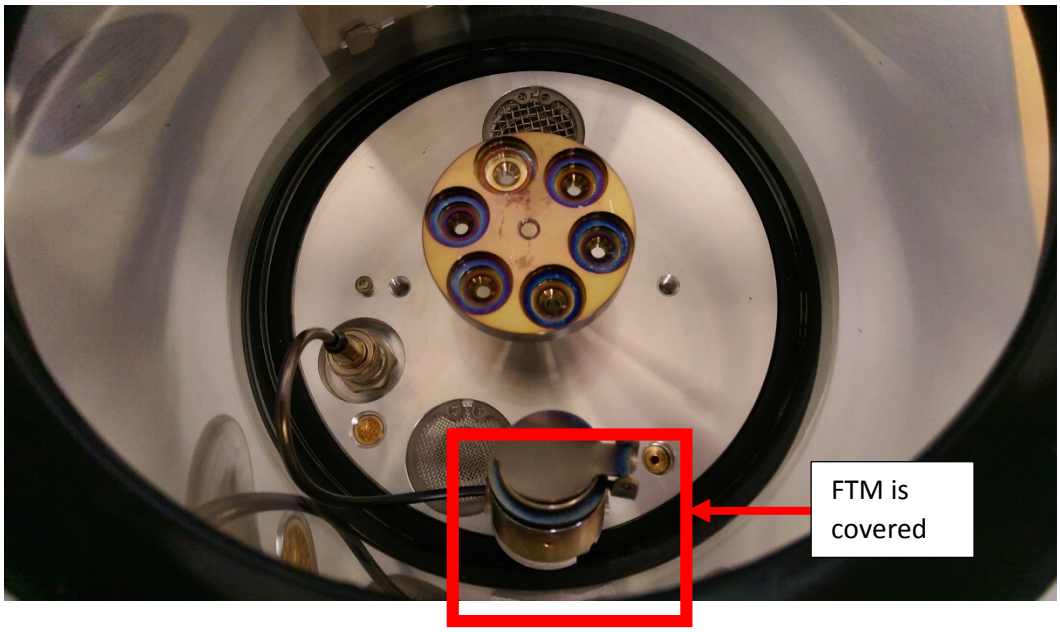


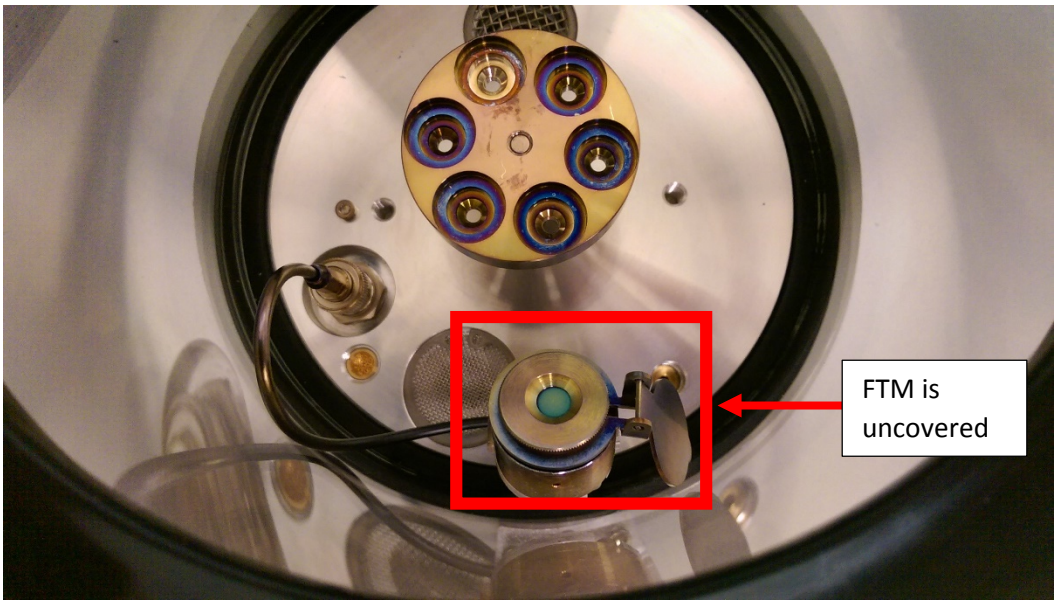


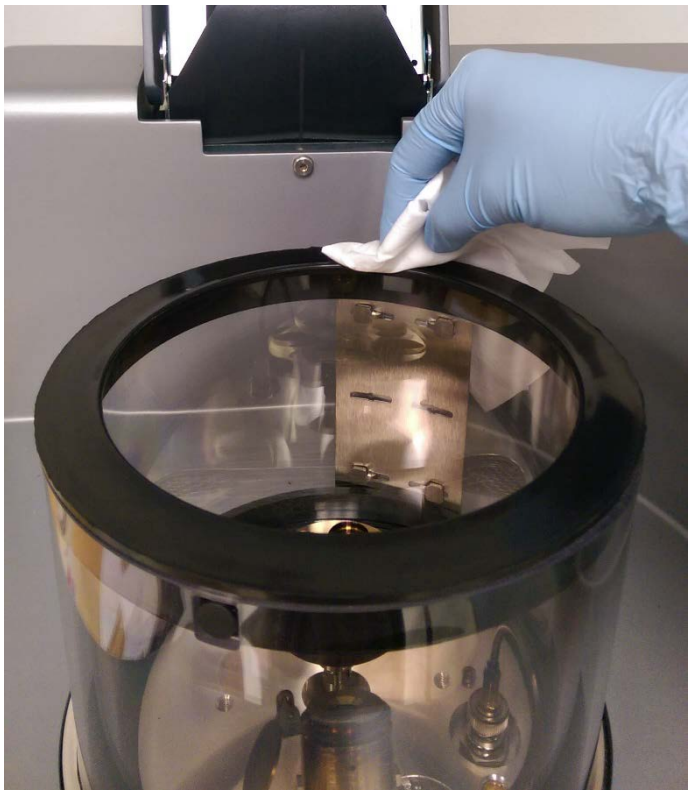
Place sample into one of the holes of the sample stage. The sample stage can hold up to 6 samples and rotates during the deposition. The stub should rest at the same height as surface of the sample stage.

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Make sure the film thickness monitor (FTM) is uncapped, especially if you are running controlled depositions. **The system will NOT automatically open this cap for you**.



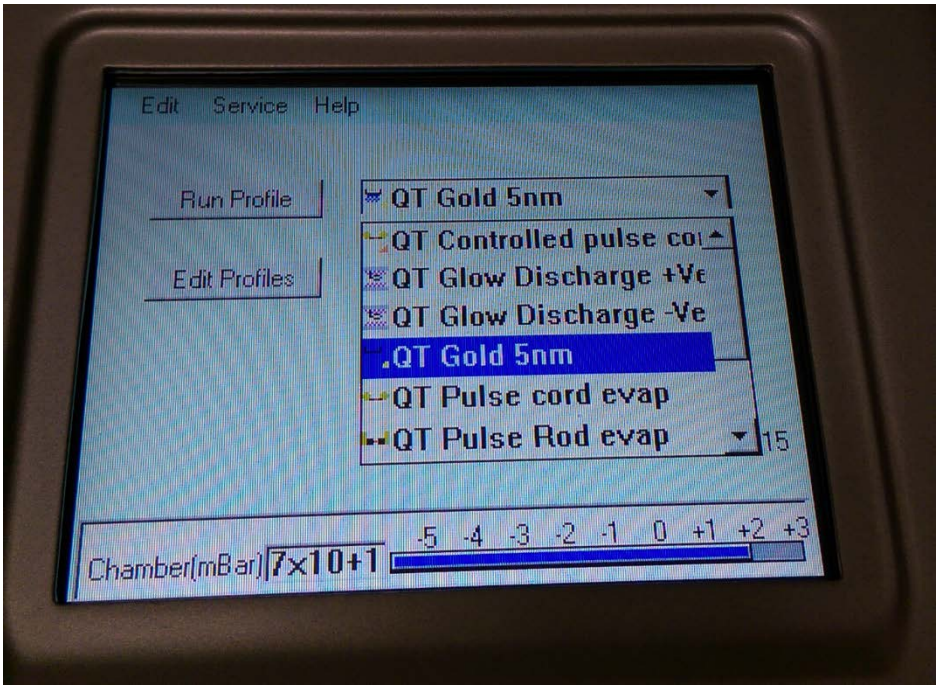




Make sure O-ring is clear of debris. If necessary, spray a small amount of IPA into a tekwipe and wipe the O-ring. Close the lid and set up the profile for deposition using the touch screen system to the right of the chamber.

Use the stylus, and tap on the down arrow button to open the drop down list of profiles (Table 1) and select the desired process.

Press **edit profiles** and select either **QT gold 5nm** or **QT controlled pulse cord** for carbon evaporation



PROFILE NAME	PURPOSE
QT Glow Discharge +ve	Modify surfaces properties to hydrophilic or hydrophobic
QT Glow Discharge -ve	Etching / cleaning and modifying surfaces properties to hydrophilic
QT Gold 5nm*	Sputter coating run using Gold target terminated by FTM at a coating thickness of 5nm (see page 25)
QT Timed Gold	Sputter coating run using Gold target terminated by time
QT Pulse cord evap	Evaporation using carbon cord (see page 26)
QT Vent chamber	Vent sample chamber

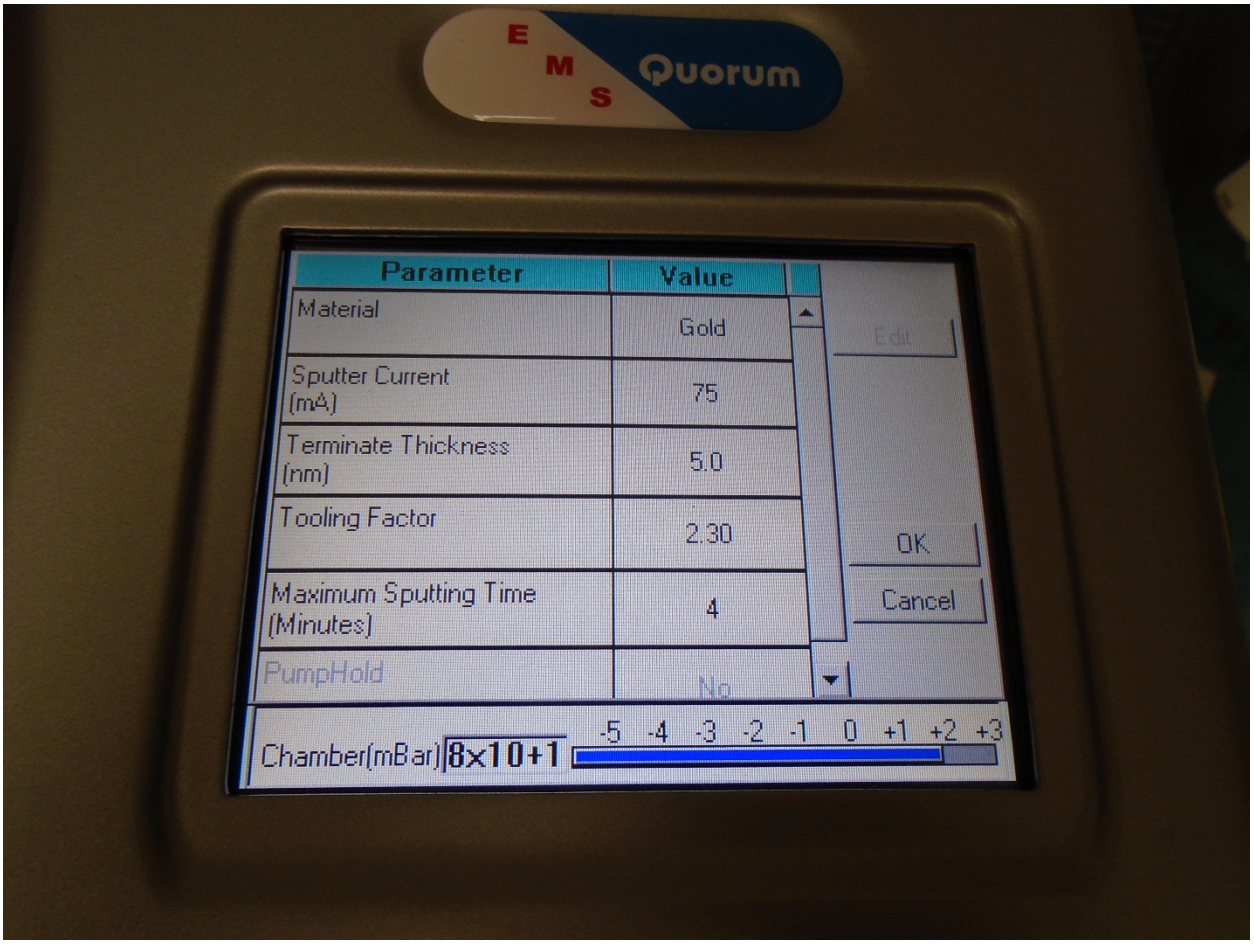
** Profile only present on systems equipped with FTM.*

Table 1. List of general profiles available and description of each profile. QT Gold 5nm has preset values for gold deposition. QT Controlled pulse cord has the specific profile for depositing carbon to a defined thickness.

Gold Depositions

For **gold** depositions make sure the terminate thickness is between **1 and 20 nm**.

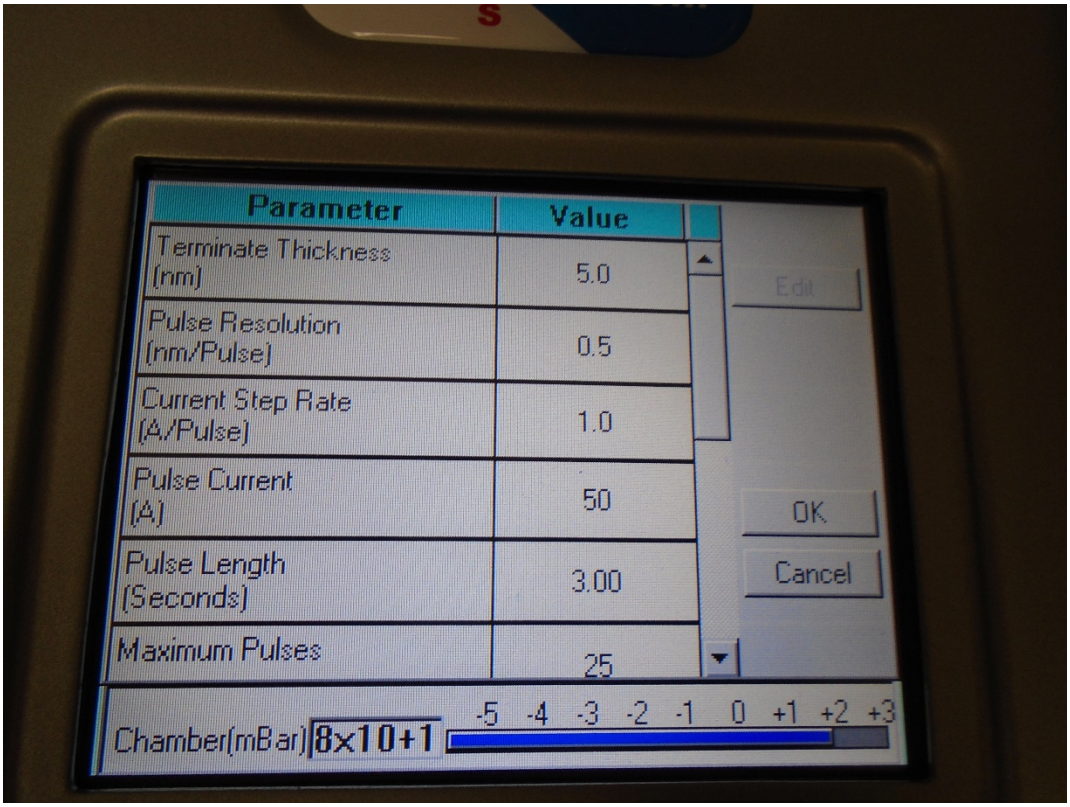
ANY DEPOSITIONS ABOVE A 20nm THICKNESS WILL DAMAGE THE TARGET



On this screen make sure the following values are in the profile

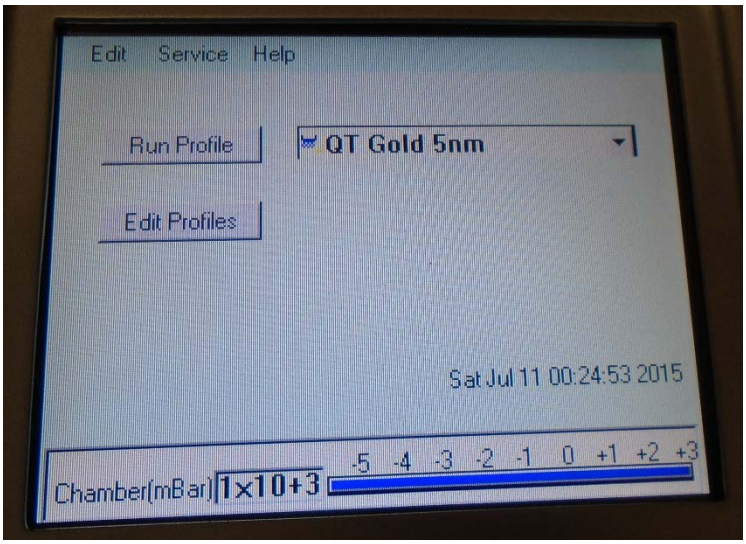
Parameter	**Value**
Material	Gold (fixed, read only parameter)
Sputter Current	50 mA
Terminate Thickness (nm)	**1-20 nm** (for QT Gold 5 nm)
Tooling Factor	2.30
Maximum sputtering time	1 minute

For **controlled pulse cord carbon** evaporations, make sure the terminate thickness is between 1 and 20 nm



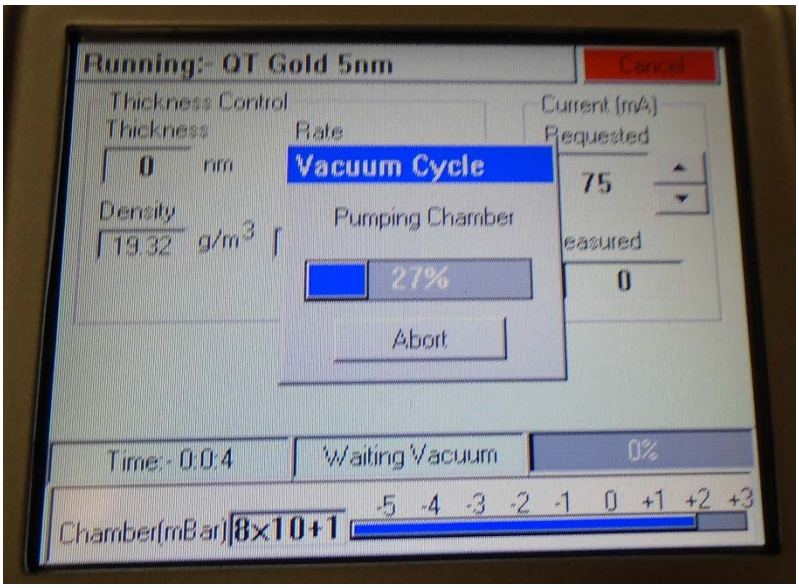
The values on this screen should be the following:

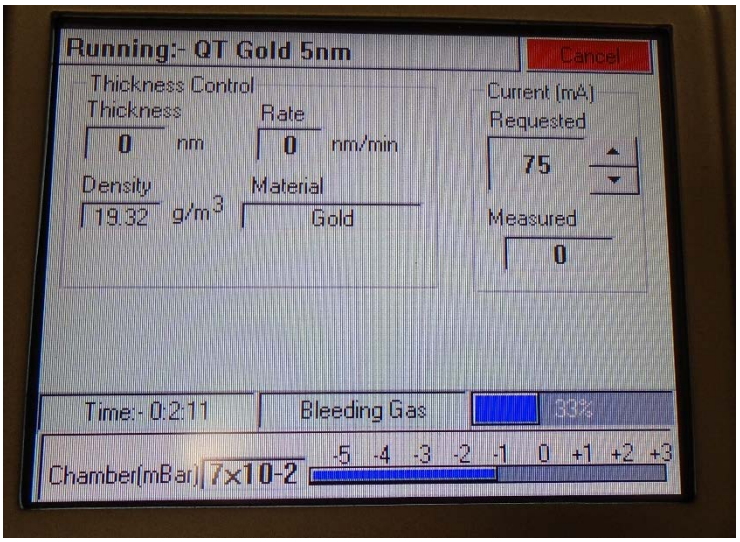
Parameter	**Value**
Material	Carbon (fixed read only parameter)
Terminate Thickness (nm)	**1-20 nm**
Pulse Resolution (nm/Pulse)	.5
Current Step Rate (A/Pulse)	1
Pulse Current (A)	50 A
Pulse Length (Seconds)	3 seconds
Max Pulses	25
Pulse Interval (s)	10
Out gas time (s)	30
Out gas current (A)	30
Max outgas recovery time (s)	60 (read only)
Pump hold	Yes (read only)
Tooling Factor	2.25 (read only)

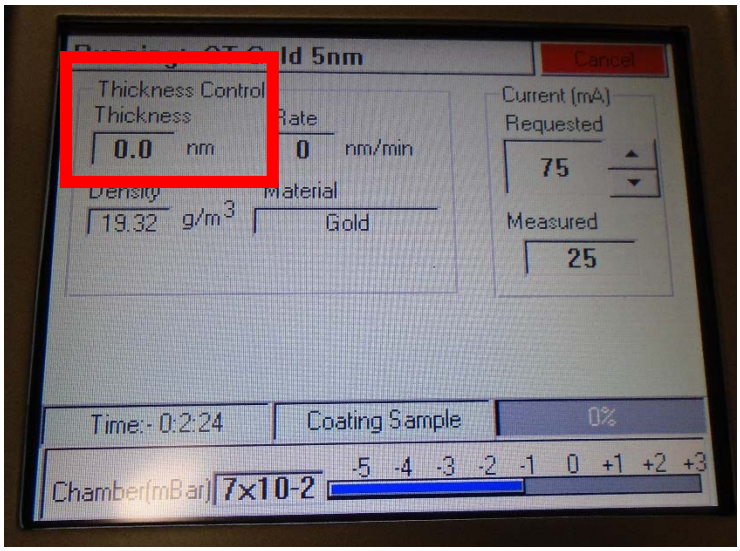


Tap on the **Run Profile** button. The Q150RES starts pumping the sample chamber. The progress of the run is shown through a series of on-screen messages.

When you want to stop a run while it is in progress, tap on the cancel button



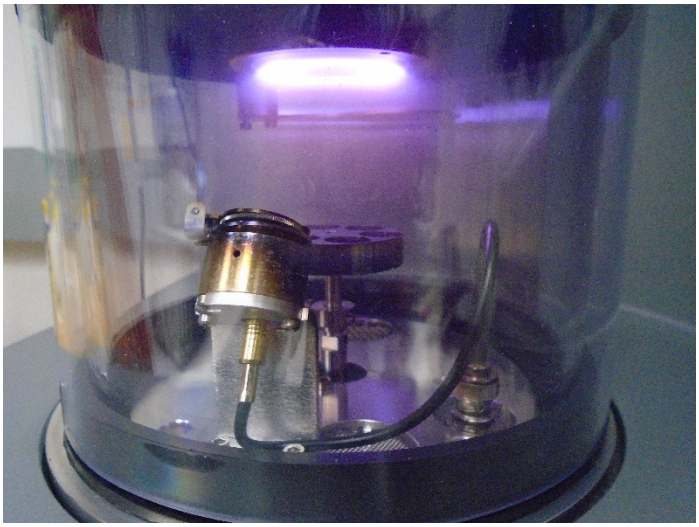




When it is coating the sample, make sure the plasma is ignited and the shutter is open.

At the completion of the run, the Q150R begins to vent the chamber. If you want to record thickness control or current information, make a note of it now. When the chamber has been vented, the display reverts to the standby screen.

Leave the chamber vented and make sure the tool is disabled from Badger



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